

What is Claimed is:

1. A marking device comprising:
  - a housing of the device;
  - 5 a frame pivotally mounted in the housing about a first axis;
  - a marking head mounted on the frame for translational movement in the frame by a first motor in a first direction parallel said first axis and spaced therefrom; and
  - 10 a second motor arranged to pivot the frame with respect to the housing about said first axis in a second, substantially orthogonal direction.
- 15 2. A marking device as claimed 1, in which the housing further comprises a handle by means of which the device may be manipulated.
3. A marking device as claimed 1, in which a window is  
20 provided in the housing through which the marking head protrudes.
4. A marking device as claimed in claim 3, in which the window is detachable from the housing.
- 25 5. A marking device as claimed in claim 3, in which the window comprises a V-section across said first direction and is adjustable on the housing in a third direction substantially orthogonal to said first and  
30 second directions.
6. A marking device as claimed in claim 3, in which the window has a facing of resilient material adapted to abut a surface to be marked.

7. A marking device as claimed in claim 1, in which said marking head has a pin arranged to be driven in a third direction substantially orthogonal said first and second directions against a surface to be marked.

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8. A marking device as claimed in claim 7, in which said pin is driven by a solenoid coil in a head housing and comprises a ferromagnetic piston slideable in a chamber to impact a base of said pin.

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9. A marking device as claimed in claim 8, in which a return spring returns the pin and piston to a ready position.

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10. A marking device as claimed in claim 1, in which the frame comprises a rail and a carriage slideable along said rail in said first direction.

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11. A marking device as claimed in claim 7, in which the frame comprises a rail and a carriage slideable along said rail in said first direction, and in which said head housing is mounted substantially directly on said carriage and is about the same dimensions as said carriage so that recoil impacts of said piston are transmitted directly into said carriage and thence to the rail and frame.

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12. A marking device as claimed in claim 1, in which said housing is a clamshell housing opening in said first direction, said frame having a pivot pin captured in a bearing bush in each clamshell.

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13. A marking device as claimed in claim 12, in which a disc spring is disposed on at least one pin between the housing and the frame to take up any tolerance

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between the housing and frame.

14. A marking device comprising:

a housing of the device;

5 a frame arranged for pivotal movement with respect to the housing about a first axis;

a marking head mounted on the frame for translational movement in the frame by a first motor in a first direction parallel said first axis and spaced therefrom; and

10 a second motor arranged to pivot the frame with respect to the housing about said axis in a second, substantially orthogonal, direction; wherein

15 said marking head includes a stylus pin adapted to be driven in a third direction substantially orthogonal said first and second directions against a surface to be marked, the device having a centre of gravity substantially coincident said third direction over substantially all movements of the frame in said

20 second direction.

15. A marking device as claimed in 14, in which the housing further comprises a handle by means of which the device may be manipulated.

25 16. A marking device as claimed in 14, in which the motors each comprise a body, and a rotary armature threaded on a fixed screw.

30 17. A marking device as claimed in claim 16, in which the first motor is carried on the carriage, the first screw being fixed in the frame.

18. A marking device as claimed in claim 17, in which the

35 frame comprises a U-shaped element along the base of

which is fixed a rail and between the arms of which is fixed the screw.

19. A marking device as claimed in claim 18, in which the  
5 solenoid, carriage, rail and the rotational axis of said first motor, are all in line.
20. A marking device as claimed in claim 14, further  
10 comprising a sub-frame which is pivotally mounted in the frame about a sub-axis parallel said first axis, the second motor being fixed in said sub-frame, the fixed screw of the second motor being fixed in a clevis pivoted in the housing about a clevis axis also parallel said first axis.
21. A marking device as claimed in claim 19, further  
15 comprising a sub-frame which is pivotally mounted in the frame about a sub-axis parallel said first axis, the second motor being fixed in said sub-frame, the fixed screw of the second motor being fixed in a  
20 clevis pivoted in the housing about a clevis axis also parallel said first axis, and in which said sub-axis is also inline with said solenoid carriage, rail and the rotational axis of said first motor.
22. A marking device as claimed in claim 20, in which the  
25 housing further comprises a handle by means of which the device may be manipulated, and in which said clevis comprises pivot pins captured in a bearing bush in each clamshell in the region thereof forming  
30 said handle of the device.
23. A marking device as claimed in claim 14, wherein said  
35 frame is pivotally mounted in the housing about said first axis.

24. A marking device as claimed 14, in which a window is provided in the housing through which the marking head protrudes.

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25. A marking device as claimed in claim 14, in which said pin is driven by a solenoid coil in a head housing and comprises a ferromagnetic piston slideable in a chamber to impact a base of said pin.

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26. A marking device as claimed in claim 14, in which the frame comprises a rail and a carriage slideable along said rail in said first direction.

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27. A marking device as claimed in claim 25, in which the frame comprises a rail and a carriage slideable along said rail in said first direction, and in which said head housing is mounted substantially directly on said carriage and is about the same dimensions as said carriage so that recoil impacts of said piston are transmitted directly into said carriage and thence to the rail and frame.

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28. A marking device as claimed in claim 23, in which said housing is a clamshell housing opening in said first direction, said frame having a pivot pin captured in a bearing bush in each clamshell.

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29. A marking device as claimed in claim 28, in which a disc spring is disposed on at least one pin between the housing and the frame to take up any tolerance between the housing and frame.

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30. A marking device comprising:  
a housing of the device;

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a frame arranged for pivotal movement with respect to the housing about a first axis;

5 a marking head mounted on the frame for translational movement in the frame by a first motor in a first direction parallel said first axis and spaced therefrom; and

a second motor arranged to pivot the frame with respect to the housing about said axis in a second, substantially orthogonal, direction; wherein  
10 said motors are disposed substantially within the confines of the frame.

31. A marking device as claimed in 30, in which the housing further comprises a handle by means of which  
15 the device may be manipulated.

32. A marking device as claimed in 30, in which the housing further comprises a handle by means of which  
20 the device may be manipulated.

33. A marking device as claimed in 30, in which the motors each comprise a body, and a rotary armature threaded on a fixed screw.  
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34. A marking device as claimed in claim 33, in which the first motor is carried on the carriage, the first screw being fixed in the frame.

30 35. A marking device as claimed in claim 33, in which the frame comprises a U-shaped element along the base of which is fixed a rail and between the arms of which is fixed the screw.

35 36. A marking device as claimed in claim 35, in which the

solenoid, carriage, rail and the rotational axis of said first motor, are all in line.

5 37. A marking device as claimed in claim 30, further comprising a sub-frame which is pivotally mounted in the frame about a sub-axis parallel said first axis, the second motor being fixed in said sub-frame, the fixed screw of the second motor being fixed in a clevis pivoted in the housing about a clevis axis  
10 also parallel said first axis.

15 38. A marking device as claimed in claim 35, further comprising a sub-frame which is pivotally mounted in the frame about a sub-axis parallel said first axis, the second motor being fixed in said sub-frame, the fixed screw of the second motor being fixed in a clevis pivoted in the housing about a clevis axis  
20 also parallel said first axis, and in which said sub-axis is also inline with said solenoid carriage, rail and the rotational axis of said first motor.

25 39. A marking device as claimed in claim 36, in which the housing further comprises a handle by means of which the device may be manipulated, and in which said clevis comprises pivot pins captured in a bearing bush in each clamshell in the region thereof forming said handle of the device.

30 40. A marking device as claimed 30, in which a window is provided in the housing through which the marking head protrudes.

35 41. A marking device as claimed in claim 30, in which said marking head has a pin arranged to be driven in

a third direction substantially orthogonal said first and second directions against a surface to be marked.

5 42. A marking device as claimed in claim 41, in which said pin is driven by a solenoid coil in a head housing and comprises a ferromagnetic piston slideable in a chamber to impact a base of said pin.

10 43. A marking device as claimed in claim 30, in which the frame comprises a rail and a carriage slideable along said rail in said first direction.

15 44. A marking device as claimed in claim 42, in which the frame comprises a rail and a carriage slideable along said rail in said first direction, and in which said head housing is mounted substantially directly on said carriage and is about the same dimensions as said carriage so that recoil impacts of said piston are transmitted directly into said carriage and  
20 thence to the rail and frame.

25 45. A marking device as claimed in claim 30, in which said housing is a clamshell housing opening in said first direction, said frame having a pivot pin captured in a bearing bush in each clamshell.

30 46. A marking device as claimed in claim 1, in which said first axis is between a marking point of said marking head and the point of application of said second motor to the frame.

35 47. A marking device as claimed in 46, in which the distance between the marking point and said first axis is greater than the distance between said first axis and said point of application.



48. A marking device as claimed in claim 46, in which said point of application comprises said sub-axis.
- 5 49. A marking device as claimed in claim 2, in which said handle comprises a pistol grip and includes a trigger to actuate the marking device.
- 10 50. A marking device as claimed in claim 1, further comprising a separate console controlling actuation of the motors to move the marking head in a desired pattern and to fire the marking head.
- 15 51. A marking device as claimed in claims 49, further comprising a separate console controlling actuation of the motors to move the marking head in a desired pattern and to fire the marking head, in which a control lead from said console enters a base of said pistol grip handle.
- 20 52. A marking device as claimed in claim 51, in which said lead terminates on a distribution board disposed in said pistol grip handle.